DEPARTMENT OF THE ARMY
MILITARY TRAFFIC MANAGEMENT COMMAND
TRANSPORTATION ENGINEERING AGENCY
720 THIMBLE SHOALS BOULEVARD, SUITE 130
NEWPORT NEWS, VIRGINIA 23606-2574

REPLY TO ATTENTION OF:

MTTE-DPE (70-47a) 26 Feb 97

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Final Transportability (TR) Engineering Analysis and Approval for the M1101 and M1102 High Mobility Trailers (HMTs) (TR 90-4v-16)

1. References:

a. AR 70-47, *Engineering for Transportability*, 19 Aug 85.

b. Purchase Description, High Mobility Trailer, Amendment 11, 19 Jan 95.

c. Report, U.S. Army Combat Systems Test Activity, May 95, subject: Production Qualification Test (PQT) of the HMT.

d. Drawings, U.S. Army Defense Ammunition Center and School (USADACS), Jul 94, subject: U.S. Army Unitization, Storage and Outloading Drawings for Ammunition and Components, Revision 3.

2. In accordance with reference 1a, we are granting TR approval for type classification-standard and concur with full materiel release for the M1101 and M1102 for highway, rail, marine, and air transport modes subject to the restrictions in paragraph 3.

3. Our analysis shows that the M1101 and M1102 (see fig 1), which are identical trailers (except for the payload capacity) that have the same tires, wheels, and track width as the High Mobility Multipurpose Wheeled Vehicle (HMMWV), meet their transportability requirements as stated in the purchase description (ref 1b), except for the cargo tiedown provisions (see paragraph 3h). We used data provided in reference 1c (summarized in fig 2 and table 1) as the basis for our analysis and approval. A summary of our analysis of the M1101 and M1102 follows:

Figure 1. M1101/M1102 with soft-top kit.

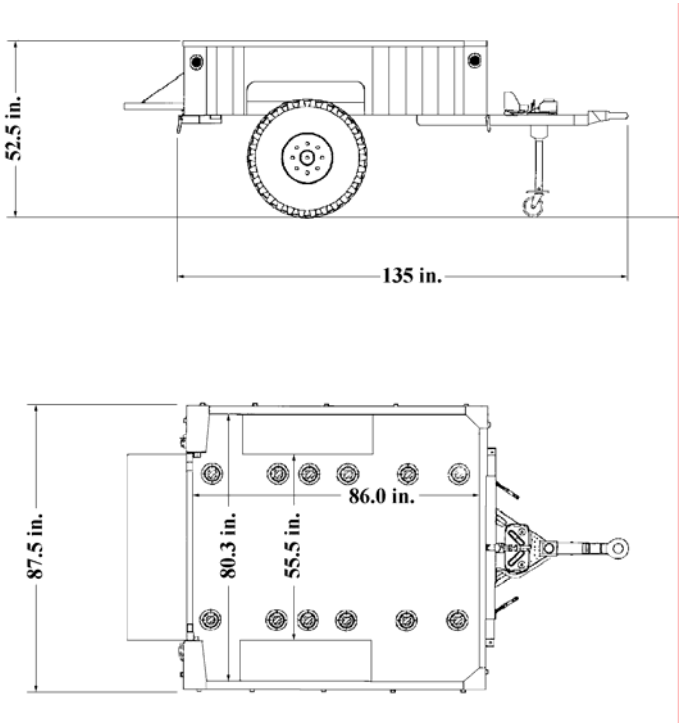

Figure 2. Physical Characteristics

TABLE 1
Physical Characteristics

Variant	Curb Weight (lb)	Gross Weight (lb)	Max. Tongue Weight (lb)	Height with soft-top kit (at curb weight) (in.)
M1101	1,360[1/]	3,400	250	99.5
M1102	1,360[1/]	4,200	420	99.5
Soft-top kit		80		
[1/]Does not include soft-top kit.				

a. Highway. For highway transport, the M1101 will be towed by Group I/II/III HMMWVs and the M1102 will be towed by Group III HMMWVs (see table 2 for specific model numbers). The weights and dimensions of these combinations meet all defined legal limits and allow unrestricted movement throughout the United States and all foreign countries.

TABLE 2
Prime Movers

Variant	Compatible HMMWVs	
M1101	Group I:	M966, M998, M1025, M1026, M1036, M1038, M1043, M1044, M1045, M1046
	Group II:	M996, M997, M1035, M1037, M1042
	Group III:	M1097, M1097A1
M1102	Group III:	M1097, M1097A1

b. Rail. The M1101 and M1102, when mounted on a 50-inch deck height railcar, are within both the AAR and GIC equipment gauge clearance diagrams allowing unrestricted movement on standard gauge railways worldwide. The M1101 and M1102 successfully completed the MIL-STD-810E rail impact test at gross vehicle weight (GVW) on 2 Feb 95 at the Aberdeen Test Center (ATC) in Maryland. The M1101 and M1102 should be restrained for rail transport in accordance with MTMCTEA Pamphlet 55-19, *Tiedown Handbook for Rail Movements*, page B-7.

c. Marine. The M1101 and M1102 are transportable by all strategic materiel transport vessels. These trailers should be restrained for marine transport in accordance with MTMCTEA Ref 97-55-22, *Marine Lifting and Lashing Handbook*, page 5-5.

For logistics-over-the-shore (LOTS) operations, the M1101 and M1102 are transportable on LARC-LX and larger vessels of the Army tactical watercraft fleet.

d. Air, Fixed-Wing. The Air Force certified the M1101 and M1102 for air transport in C-130, C-141, C-5, and C-17 prime mission cargo aircraft, subject to the restrictions in enclosure 1.

e. Air, Rotary Wing. The Natick Research, Development and Engineering Center (NATICK) certified the M1101 and M1102, without the soft-top kit installed, for external air transport (EAT) by UH-60 A/L/M, CH-47D, and CH-53E helicopters, subject to the restrictions in enclosure 2.

f. Low Velocity Airdrop (LVAD). NATICK certified the M1101 and M1102, without the soft-top kit installed, for LVAD by C-130, C-141, C-5 and C-17 aircraft, subject to the restrictions in enclosure 2.

g. Lift/Tiedown. The lifting and tiedown provisions of the M1101 and M1102 meet the requirements of MIL-STD-209H and MIL-STD-814C. Testing of the lifting and tiedown provisions was successfully completed at GVW at ATC on 7 Sep 94. The M1101 and M1102 should be lifted in accordance with enclosure 3. This figure will be included in future updates of the *Marine Lifting and Lashing Handbook* (MTMCTEA Ref 55-22).

h. Cargo Tiedown Provisions. The cargo tiedown provisions meet the strength requirements of MIL-STD-209H, but do not meet the dimensional or functional requirements of class 5 cargo tiedown provisions (see fig 7, MIL-STD-209H). However, USADACS testing showed that special procedures can be employed to prevent tearing when 1-1/4-inch steel banding is used. These procedures will be published in future revisions of reference 1d. Pending the publication of this revision, the procedures can be obtained from USADACS, at DSN
585-8074 or (815) 273-8074.

i. Containerization. The M1101 and M1102, without the soft-top kit installed, is transportable in all American National Standards Institute/International Organization for Standardization (ANSI/ISO) closed-top containers. The trailers should be blocked and braced in accordance with MTMCTEA Ref 96-55-23, *Containerization of Military Vehicles,* page 22.

j. Center of Gravity (CG). There are CG limitations for the M1101 and M1102. The vertical CG must not exceed 47 inches above the ground; the lateral CG should be within 1-inch of the longitudinal centerline to maintain a +/- 5% balance on each wheel; and the longitudinal CG should be such that the maximum tongue weight (see table 1) is not exceeded.

k. Limitations. A number of trailer/chassis adaptations have been or are being marketed under "HMT" and "High Mobility Trailer" pseudonyms for use with other military development and production programs (e.g., TROJAN SPIRIT II, JSTARS, FAAD-GBS). This transportability approval does not apply to those trailers. This approval applies only to the M1101 and M1102.

4. This concludes the requirement for TR approval. Please consult us to discuss the need for a new TR approval should changes occur that increase system size or weight, modify lifting and tiedown provisions, or prior to any future rebuys of this system (see ref 1a). The point of contact for the HMT is DSN 826-4643, or (757) 878-4646, or e-mail: dpemail@tea.army.mil.

FOR THE DIRECTOR:

3 Encls

Original Signed
Chief, Deployability Division

These limits are listed in Tables 3 and 4.

TABLE 3
HMT-H and HMT-HC CG Limits

Orientation	Limits
Vertical	No higher than 46.0 inches above ground.
Longitudinal	May be up to 9.4 inches in front of axle centerline, but must be at least 4.7 inches in front of axle centerline.
Lateral	Must be within 1-inch of longitudinal centerline.

TABLE 4
HMT-L CG Limits

Orientation	Limits
Vertical	No higher than 46.0 inches above ground.
Longitudinal	May be up to 6.9 inches in front of axle centerline, but must be at least 4.7 inches in front of axle centerline.
Lateral	Must be within 1-inch of longitudinal centerline.

MTTE-DPE
SUBJECT: Final Transportability (TR) Engineering Analysis and Approval for the High Mobility Trailer (HMT) (TR 90-4v-16)

2. The HMT is a family of trailers that have the same tires, wheels, and track width as the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The three variants of the HMT include the M1101, M1102, and the HMT-Heavy Chassis (HMT-HC). Only the M1101The HMT-L and HMT-H, shown in figure 1, are identical except for the information on the dataplate. Figure 2 shows the HMT-HC with a tactical quiet generator (TQG) and associated mounting kit installed. In accordance with reference 1a, we are granting TR approval to the HMT for the highway, rail, marine, and air transport modes, subject to the restrictions in paragraph 3.